Argonne NATIONAL LABORATORY

Argonne Leadership Computing Facility (ALCF)

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U.S. DEPARTMENT OF ENERGY

The DOE Leadership Computing Facility

- Collaborative, multi-lab, DOE/SC initiative ranked top national priority in ***Facilities for the Future of Science: A Twenty-Year Outlook.***
- Mission: Provide the computational and data science resources required to solve the most important scientific & engineering problems in the world.
- Highly competitive user allocation program (INCITE, ALCC).
- Projects receive 100x more hours than at other generally available centers.
- LCF centers partner with users to enable science & engineering breakthroughs (Liaisons, Catalysts).

OAK RIDGE National Laboratory

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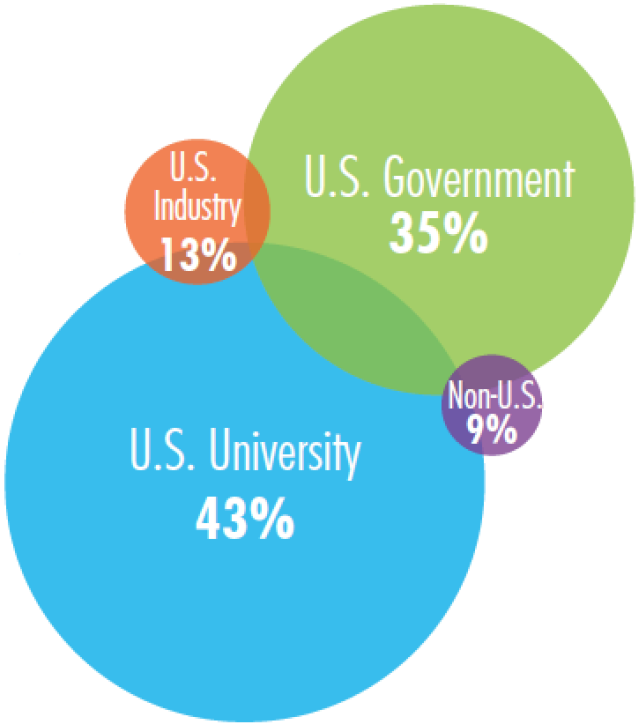
ALCF User Community

- ALCF is targeted to a few very large science projects
- Minimal award in 2014 expected to be at least 50M core-hours
- Diverse base of users with diverse needs
- Support and provide compute time to individuals and teams of researchers from academia, national laboratories, and industry
- Wide-range of scientific disciplines utilize our resources
- INCITE 60%, ALCC 30%, Discretionary 10%

2013 INCITE Allocations:
2.1B Mira, 736M Intrepid



ALCF Users by Affiliation in 2012

Allocation Programs at the LCFs

	60% INCITE		30% ALCC		10% Director's Discretionary	
Mission	High-risk, high-payoff science that requires LCF-scale resources*		High-risk, high-payoff science aligned with DOE mission		Strategic LCF goals	
Call	1x/year – (Closes June)		1x/year – (Closes February)		Rolling	
Duration	1-3 years, yearly renewal		1 year		3m,6m,1 year	
Typical Size	30 - 40 projects	50M - 500M core-hours/yr.	5 - 10 projects	10M – 300+M core-hours/yr.	100s of projects	.5M – 10M core-hours
Review Process	Scientific Peer-Review	Computational Readiness	Scientific Peer-Review	Computational Readiness	Strategic impact and feasibility	
Managed By	INCITE management committee (ALCF & OLCF)		DOE Office of Science		LCF management	
Readiness	**High**		**Medium to High**		**Low to High**	
Availability	Open to all scientific researchers and organizations ***Capability > 131,072 cores (16.7% of Mira)***					

10 Petaflops Blue Bene/Q - Mira

- ***Mira* – BG/Q system**
  - 49,152 nodes / 786,432 cores
  - 786 TB of memory
  - Peak flop rate: 10 PetaFLOPs
  - 3,145,728 hardware threads
- ***Vesta (T&D)* - BG/Q system**
  - 2,048 nodes / 32,768 cores
  - 32 TB of memory
  - Peak flop rate: 420 TF
- ***Tukey* – Nvidia system**
  - 100 nodes / 1600 x86 cores/ 200 M2070 GPUs
  - 6.4 TB x86 memory / 1.2 TB GPU memory
  - Peak flop rate: 220 TF
- **Storage**
  - Scratch: 28.8 PB raw capacity, 240 GB/s bw (GPFS)
  - Home: 1.8 PB raw capacity, 45 GB/s bw (GPFS)
  - Storage upgrade planned in 2014
  - Cross-mounted on Compute and Data Analytics

- **WAN**
  - 100 Gbit/s
  - ALCF connected to at 10x10
- **Globus Online, GridFtp**

Science Domains on Mira and Intrepid in 2013

2013 ALCF Projects by Domain

Researchers from a wide range of disciplines were awarded a total of 5.8 billion core-hours on Mira and Intrepid in 2013.